

"Bicycle safety pedal"

** * * BACKGROUND OF THE INVENTION*
DESCRIPTION

This invention relates to a safety pedal for bicycles, of the type comprising a device for quick coupling to a cleat fastened to the sole of a shoe, including a toe element for receiving a front end of the cleat and a rear fastening device, which is suitable for engaging the rear end of the cleat when this is pressed over said rear fastening device, and which is also suitable for releasing the cleat when this is rotated in the general plane of the pedal in such a way that its rear end moves laterally, said pedal comprising a flat resting surface for the cleat, including cam means for opposing said releasing rotation of the cleat and for lifting the side of the cleat which is moved away from the centre of the pedal when said releasing rotation is imposed on the cleat.

A pedal of the type described above is disclosed, for example, in Italian patent no. 1,257,143, in the corresponding French patent no. 2,697,493, in the corresponding German patent no. 4,323,575 and in the corresponding US patent no. 5,419,218.

Figure 1 of the accompanying drawings is identical to figure 1 of the above mentioned documents. The description of each of the aforesaid documents is incorporated herein by reference.

In said known pedal, the cleat 5 to be mounted on the sole of a shoe can be rapidly coupled to the pedal. For this purpose, the front end of the cleat is received in a toe element 14 of the pedal, after which the rear end of the cleat is pressed over a horizontal arm 28 of a spring 18, which thus snap locks said rear end holding it in position. In this coupling condition, the shoe can be released from the pedal by turning the

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foot in the general plane of the pedal so as to move the rear end of the cleat 5 towards one of its sides. Typically, the heel of the shoe is moved laterally outwards with respect to the bicycle, in the mounted 5 condition of the pedal on a bicycle, so that the horizontal arm 28 of the spring 18 turns on the axis of the vertical arm 27, releasing thereby the cleat 5. Furthermore, in said known pedal, the resting plane of the cleat 5 over the pedal is defined by a plate 15 10 fastened over the body of the pedal and including two slanted tabs 40, diverging upwards, acting as means for opposing the rotation of the cleat 5 in the general plane of the pedal. More precisely, the tabs 40 cause a cam-like effect on the cleat 5 when said releasing 15 rotation is impressed to the latter, whereby the side of the cleat 5 which is moved away from the centre of the pedal during said rotation is forced by the respective tab 40 to raise upwardly. In this way, the advantages of preventing undesired releasing of the 20 cleat from the pedal during normal use of the bicycle is obtained, because the pressure exerted by the cyclist on the pedal opposes a lifting movement of the cleat, whilst, on the other hand, releasing of the shoe from the pedal is ensured in emergency conditions, for 25 example in the case of a fall or in any other case in which the cyclist ceases to impose pressure on the pedal.

In the above mentioned known solution, the mode of operation described above occurs both when the heel of 30 the shoe is moved laterally outwards with respect to the bicycle, i.e. when it is moved away from the bicycle, and when the heel of the shoe is moved laterally inwards.

This will
The object of this invention is to improve the 35 above mentioned known solution.

- In order to achieve this object, this invention relates to a pedal having the features indicated at the beginning of this description and further characterised in that said cam means are only arranged on the side of
- 5 the pedal located outwards (with reference to the mounted condition on the bicycle), so that said cam means are operative only when the rear end of the pedal is moved laterally outwards, with respect to the bicycle, from its engaged position.
- 10 In a first embodiment, said resting surface of the pedal does not present any means for opposing the rotation of the cleat on the inner side thereof, whereby the lateral inwards movement of the rear end of the cleat, starting from its engaged position, does not
- 15 cause any lifting movement of the internal side of the cleat.
- 20 In a second form of embodiment, the resting surface comprises a stop on the internal side for preventing any lateral inwards movement of the rear end of the cleat.
- The former embodiment mentioned above presents the advantage of being more simply constructed with respect to the known solution, without practically causing any problems, since the need to prevent accidental release
- 25 of the shoe from the pedal only exists for lateral outwards movements of the shoe heel.
- The second form of embodiment is instead preferable if, because of a specific structure of the pedal, the lateral inwards movement of the rear end of
- 30 the cleat must be totally prevented.
- 35 Preferably, in the actual embodiments of the invention, the cam means of the pedal consist of a ramp forming part of a projection made by drawing in a metal plate which is fastened by means of screws to the body of the pedal. Similarly, in the second embodiment

mentioned above, said stop preferably consists of a projection made by drawing in said metal plate.

Tracé
Further features and advantages of this invention will become apparent from the following description, 5 with reference to the annexed drawings, given purely by way of non-limiting example, in which:

- figure 1 is a perspective exploded view of the pedal according to the prior art,
- figure 2 is a perspective view of a first 10 embodiment of the pedal according to this invention,
- figure 3 is a perspective exploded view of the pedal in figure 2,
- figure 4 is a view at an enlarged scale of a detail of figure 3 and
- 15 - figure 5 illustrates a variation of figure 4 referred to the second embodiment of this invention.

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Figure 2 illustrates a perspective view of a pedal which is essentially identical with the pedal in figure 1, with the exception that in this case the tab 40 on 20 the internal side, i.e. of the side facing the bicycle in the mounted condition of the pedal (i.e. the left side with reference to figure 2), has been totally eliminated, while the tab 40 on the opposite side of the pedal remains. Figure 3 illustrates a perspective 25 exploded view of the pedal in figure 2, the only difference lying in that the cut and bent tab 40 on the outer side is replaced by a ramp 40a forming part of a projection made by drawing in the metal plate 15 defining the resting surface of the cleat (which is not illustrated in figures 2, 3). For the rest, the pedal 30 illustrated in figures 2, 3 is essentially identical, as mentioned, to the known pedal in figure 1, with the exception of a different structure and arrangement of the various elements. In figures 2, 3, the elements 35 corresponding to those illustrated in figure 1 are

identified with the same reference numerals. The metal plate 15 defining the ramp 40a arranged on the external side of the pedal is fastened by means of two screws 16 to the body of the pedal.

Figure 4 illustrates a view at an enlarged scale of the plate 15 with two holes 16a for the passage of screws 16 and the projection defining the ramp 40a, obtained by drawing. In the pedal described above - both in the variant described in figure 2, with a slanted tab 40, and the variant illustrated in figures 3, 4, with the ramp 40a obtained by drawing - the cleat is coupled to the pedal in a way which is identical to that of the pedal according to the known technique described in figure 1. For releasing the cleat from the pedal, the operation is different according to whether the rear part of the cleat is moved laterally outwards or inwards (always with respect to the bicycle, with reference to the mounted condition of the pedal on the bicycle). In the case of the example illustrated in the drawings, referring to a right-hand pedal, if the rear part of the cleat is moved rightwards, i.e. outwards with respect to the bicycle, the operation is again identical to that of the pedal in figure 1. This is because, in this case, the rear part of the cleat acts on the spring 18 so to make it turn around the vertical axis of the part 27, whereby causing release. At the same time, the bottom surface of the cleat "climbs" over the tab 40, or over the ramp 40a (in the case of the variant in figure 2 or variant in figure 3, respectively), whereby the side of the cleat which tends to move away from the centre of the pedal is lifted. This prevents the accidental release of the shoe from the pedal during normal use of the bicycle, when the cyclist applies pressure on the pedal, while release of the pedal in emergency conditions is

favoured, for example in the case of falling, when the cleat is no longer pressed against the plate 15 by the force applied by the cyclist to the pedal. As can be seen, conversely, both the variant in figure 2 and variant in figures 3,4, are not equipped with any type of cam means on the internal side of the pedal, i.e. the side facing the bicycle, reason for which a lateral inwards movement of the rear part of the cleat can occur without lifting the internal side of the cleat.

Figure 5 illustrates a variant of figure 4, which is referred to the second embodiment of this invention. In this case, plate 15 on the external side of the pedal is equipped with a ramp 40a (or, alternatively, the tab 40), while a stop element 40b is arranged on the internal side, which in the example illustrated in figure 5 is defined by a projection obtained by drawing of the plate 15, with a stop surface 40c essentially perpendicular to the plate 15 and the axis 3 of the pedal pin, which prevents any lateral inwards movement of the rear part of the cleat. An alternative to tab 40b obtained by drawing, could be a stop surface 40c defined by a tab cut from the plate 15 and bent upwardly. In the second embodiment, any possibility of release of the cleat from the pedal following a lateral movement of the rear part of the cleat inwards, (i.e. towards the bicycle with reference to the mounted condition) is prevented.

Naturally, while the principle of the invention remains the same, the details of construction and the embodiments may widely vary with respect to what has been described and illustrated herein, without departing from the scope of the invention.

For example, the pedal of the invention may have a double-face arrangement, with a plate identical to plate 15 arranged on the opposite side of the pedal